

# THE AEROPLANE SPOTTER

FOR THE ALERT

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**THE HEARKERS' CLUB BULLETIN**

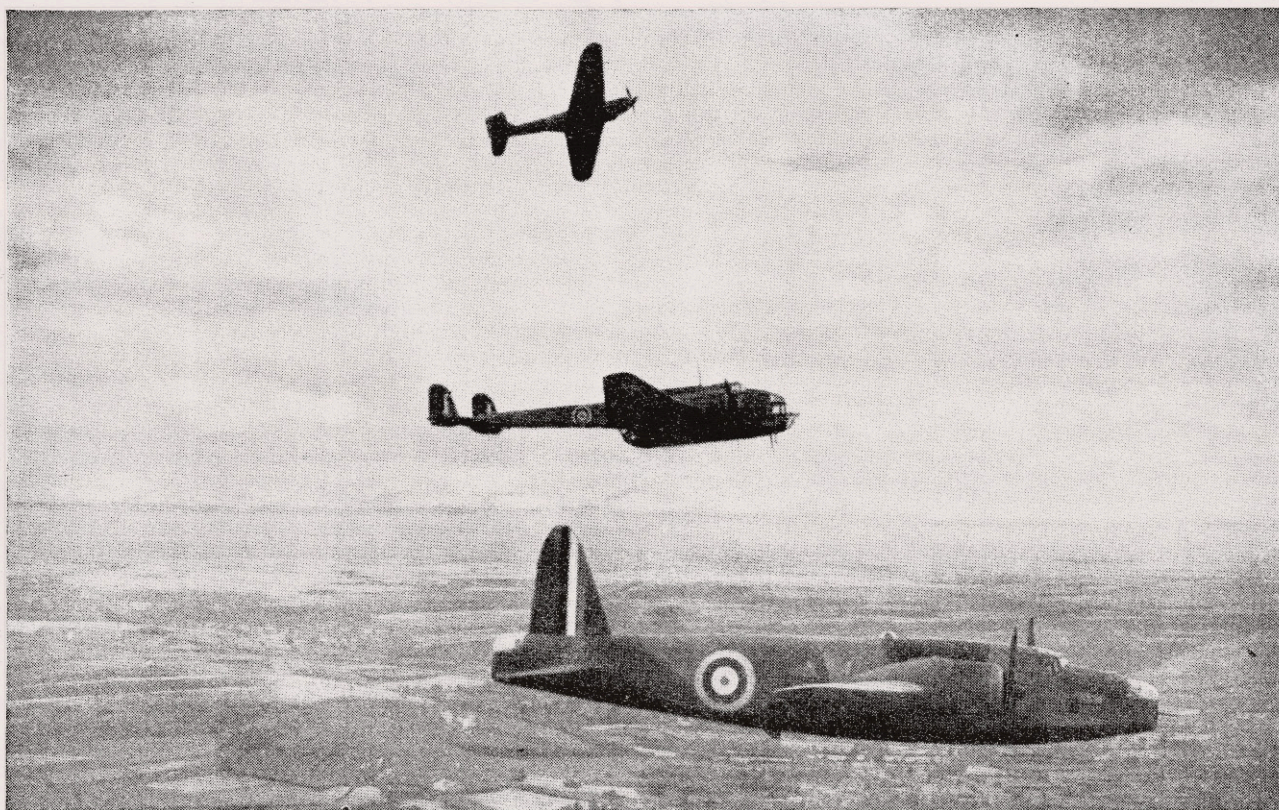
Edited by PETER G. MASEFIELD

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Technical Editor of "THE AEROPLANE."

3<sup>rd</sup>

WEEKLY

EVERY THURSDAY



A MIXED BAG—A VICKERS-ARMSTRONGS WELLINGTON I, A HANDLEY PAGE HAMPDEN AND (above) A FAIREY BATTLE.

AIRCRAFT RECOGNITION is no easy task. It demands for success qualities of dogged perseverance and concentration on the part of its devotees.

The greatest need of the moment is for some standardised method of training for newcomers to the subject, whether attending official recognition schools or teaching themselves. Obviously the ground watcher needs different coaching from the fighter pilot.

The first essential for all is a general groundwork in aeronautical matters, and particularly in aeronautical terms. Once a sound basic knowledge has been established, the budding spotter can pass on to the study of individual aeroplanes, beginning with broad principles and progressing to details.

Most instruction to-day is founded basically on silhouettes, both for convenience and because points can be clearly emphasised. Photographs are used to add "life" to the subject once the fundamental features have been grasped. Both silhouettes and photographs are essential and complementary to each other. A silhouette will provide the detail, but only a

photograph can show that individual "sit" in the air.

The danger in instruction in aircraft recognition is that it may become academic rather than practical. That must be avoided. The whole purpose of training is to enable the pupil to identify an aeroplane in the air, not merely to recognise a photograph or a drawing on a wall. Often the man who can pick out a silhouette correctly is not the best at practical identification.

That brings up the question of tests. We receive many letters seeking the best methods of procedure. Where large classes are involved there is no doubt that the best method is to use an epidiascope through which any photograph or drawing can be projected on to a screen. Models are always a great help—but they must be accurate. Recognition films are very valuable, especially in sustaining interest—so long as they, too, are accurate. Unfortunately, many of the official films are not; such as that which describes the Hudson as a low-wing monoplane and distorts the silhouette to suit.

Accuracy in every detail is the corner stone of aircraft recognition.



## NEWS OF THE WEEK

### The Westland Whirlwind

NEWS of the existence of the Westland Whirlwind single-seat two-motor fighter has been made public at last. Although it first flew some two years ago, mention of this new fighter was banned from publication until Lord Beaverbrook spoke of it on December 17.

Details of the Whirlwind were circulated to all those officially concerned with aircraft recognition some time ago. Unfortunately, we are still prevented from publishing photographs or silhouettes, although the machine is now familiar to a great number of people and has been in action.

The design of the Whirlwind is such that there seems a great likelihood of confusion between it and the new German Focke Wulf Fw 187 Zerstörer two-motor fighter, upon which the enemy are pinning great hopes for the coming offensive. We hope soon to be permitted to publish a comparison between the Whirlwind and the Zerstörer in the interests of security.

### Fighter Markings

YET ANOTHER change has been made in the markings of aeroplanes of the R.A.F. Fighter Command. The black colouring of the under surface of the port wing is now restored. The under surface of the starboard wing remains "duck egg" blue, and the red, white and blue roundels are retained on the under surfaces. The reason for the change from black and white wings was never very obvious, because, apart from the roundels, the colouring was almost the same as that of the enemy.

### Aeroplanes from the U.S.A.

SO MANY fantastic figures have been quoted for the number of aeroplanes delivered from the United States to the Royal Air Force since the War began that the true numbers are of particular interest.

In the first year of War a total of 743 aeroplanes of all types were sent from America to Great Britain. The detailed figures are:—

1933 September ...	34	April ...	23
October ...	0	May ...	19
November ...	4	June ...	97
December ...	53	July ...	173
1940 January ...	41	August ...	278
February ...	19		
March ...	2	Total ...	743
September ...	...		
			136

More than 26,000 American aeroplanes of 35 different types have been ordered for the Royal Air Force. These 35 different types, together with 20 civil types delivered or on order, make a total of 55 breeds of American aeroplanes with which the proficient spotter will have to be familiar. These, with 93 British types, 55 Germans, 42 Italians, eight French and four from the Netherlands, form a grand total of 257 types of aeroplanes to be learned by the man who prides himself on 100 per cent. efficiency. Aeroplanes in the service of Greece, Japan, Rumania, Russia, Spain and Turkey add to the list and bring the total up to around the 400 mark.

## WEEKLY NOTES FOR SPOTTERS—II

By R. A. Saville-Sneath

(Member of the Observer Corps and a Founder Member of the Harkers' Club)

SIMILARITY between Boulton Paul Defiant and the Heinkel He 113 fighter, which proved a trap for many competitors in the recent Harkers' examinations, is, fortunately, confined to the plan view from below. There is only a slight resemblance in the head-on views, and none at all from other aspects.

Even in the plan view, no possibility of confusion would arise if the He 113 were seen in combat with any British fighter, because the Heinkel has only three-quarters of the wing span of either the Defiant or the Hurricane. Furthermore, as all of its dimensions are small in proportion and the wing area of the He 113 is only about half that of either of these British fighters, a difference would be observed. The difference in size is less noticeable when compared with the Spitfire, but in that case the obvious difference in the shape of the wings would prevent confusion between the plan views of the types.

Assuming that a Heinkel 113 is seen from below in conditions which provide no satisfactory means of judging its size, there are three major distinctive points without taking into consideration the arrangement of the retractable undercarriage and radiator—details which, in all probability, would be indistinguishable. These are:—

(1) The wing of the He 113 has a smaller chord in proportion to span than the Defiant. In other words, if the plan view is enlarged so that its span is the same as that of the Defiant, the chord is appreciably smaller. This difference is so great that if you remove the ailerons and flaps from the wing of the Defiant, the narrower outline which remains roughly corresponds to the proportions of the complete wing of the He 113.

This characteristic of wing form is usually expressed by the term "aspect ratio," i.e., the ratio of the span of a wing to its

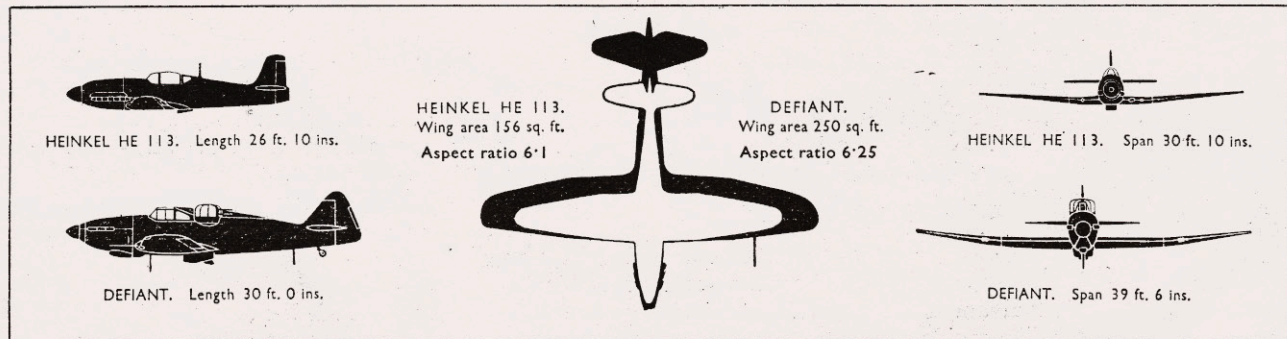
chord or width. Applying it in the present case, we should distinguish between the two wing forms by saying that the He 113 has a wing of higher aspect ratio than that of the Defiant. In fact, the aspect ratio of the Defiant is 6.25 and that of the He 113 6.1.

Point 2 is a similar distinction, but in this case we apply it to the tail, seen in plan. In other words, the tail, comprising the tailplane and elevator, although rather similar in shape to that of the Defiant, is definitely narrower in proportion to its span (or length from tip to tip).

Point 3 is very closely related to this general impression of a small slender wing form which is a characteristic to be expected in a really high-speed single-seat fighter. Notice that the centre section of the wings in both machines is practically without taper. This nearly straight centre section extends in the He 113 for less than two-fifths of the span. In the Defiant it is approximately half of the span. If we measure from the side of the fuselage, near the nose, this difference is even more marked. The untapered section of the Heinkel extends only about one quarter of the distance to the wing-tip, whilst in the Defiant it continues practically to half way.

This wide centre section, almost without taper, gives a decided appearance of breadth to the Defiant wing which is completely lacking in the small German single-seat fighter. This is a natural feature when we consider that the Defiant is a two-seat fighter carrying a heavy power-operated gun turret and that the larger and wider centre-section means extra lift for this heavier load. Once this point is clearly understood, the possibility of confusion between the two types is reduced.

Further points of distinction between the Defiant and the He 113 will be discussed by Mr. Saville-Sneath next week.



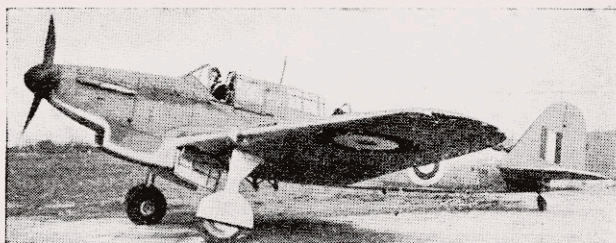


## AIRCRAFT IN THE NEWS—II

## THE FAIREY FULMAR

**N**EWEST aeroplane in service with the Royal Navy, the Fairey Fulmar two-seat eight-gun fighter (1,145 h.p. Rolls-Royce Merlin X motor) has already shot down many Italian aeroplanes without loss to itself.

The Fairey Aviation Co., Ltd., has always specialised in Naval aircraft. So when the Fleet Air Arm required a new fighter which would combine powerful armament with long range and a reasonably high speed the Fairey Co. submitted a



modification of the prototype Fairey P.4/34 light bomber of 1936. Thus the Fulmar is a direct descendant from the P.4/34, itself descended from the Fairey Battle.

The Fulmar has eight fixed Browning machine-guns in the wings, as in the Spitfire and Hurricane. They are fired by the pilot. The second man in the crew is solely an observer, radio operator and navigator. He has no armament.

The Fulmar is built entirely of metal with metal stressed-skin covering. The wheels retract into the wing roots. The tail wheel does not retract. A deck arrestor hook is placed under the fuselage. An inflatable dinghy is housed behind the aft cockpit. The wings are designed to fold for operation from aircraft carriers, but the folding details may not be shown.

No performance figures can be quoted for the Fulmar, but the top speed is known to be rather less than 300 m.p.h. The Fairey P.4/34 had a top speed of 284 m.p.h. and the Fulmar is not likely to differ greatly. Manœuvrability is excellent as is the pilot's field of view.

**POINTS OF RECOGNITION.**—Wings of low aspect ratio (5.8). Most of taper on trailing edge. Rounded tips. Long slim fuselage with cantilever tailplane mounted forward of single fin and rudder as in the Junkers Ju 88. Pointed nose with radiator underneath in front of wings.



## CIVIL IDENTIFICATION—II

## THE DOUGLAS DC-3



**B**EST known and most widely used of all the World's civil aeroplanes, the Douglas DC-3 21-seat two-motor transport monoplane is still in production at Santa Monica, California. It first flew in 1936, and followed the Douglas DC-2 of 1933, which set a new fashion for both civil and military aeroplanes throughout the World. In fact, the DC-3 is an enlarged and improved DC-2 in its essentials.

The Douglas DC-3 is a low-wing cantilever monoplane with swept-back wings, cylindrical fuselage and single fin and

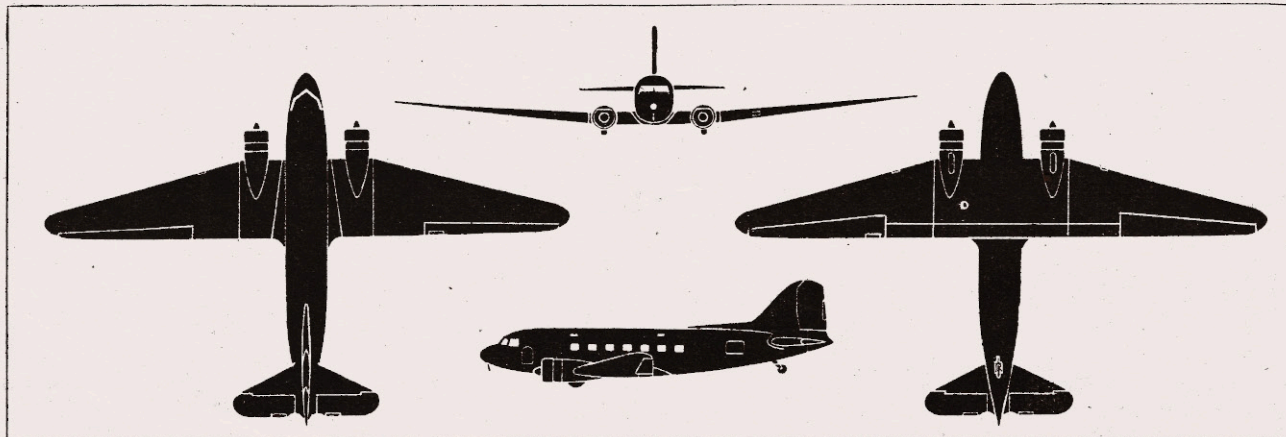
rudder. It is in service with a variety of motors from the 850 h.p. Pratt and Whitney Twin Wasp to the 1,200 h.p. Wright Cyclone G-200. Those operated from this country to Lisbon by K.L.M. have 1,100 h.p. Wright Cyclone G-102A motors and Hamilton Hydromatic fully feathering airscrews. Construction is entirely of metal with stressed metal covering. The undercarriage retracts forwards into the motor nacelles leaving half of each wheel exposed.

**DIMENSIONS.**—Span, 95 ft.; length, 64 ft. 5½ ins.; height, 16 ft. 3½ ins.; wing area, 987 sq. ft.; aspect ratio, 9.14.

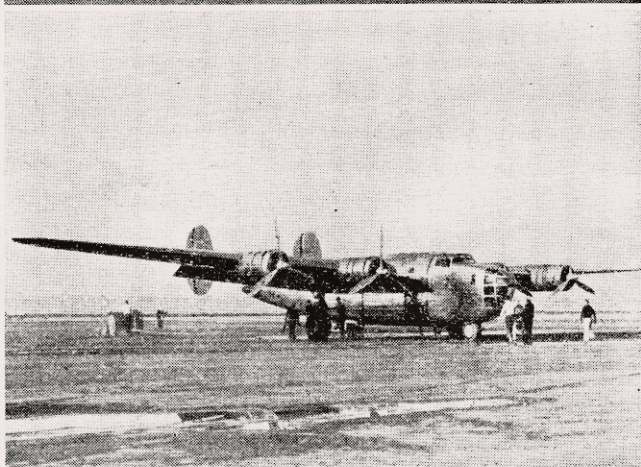
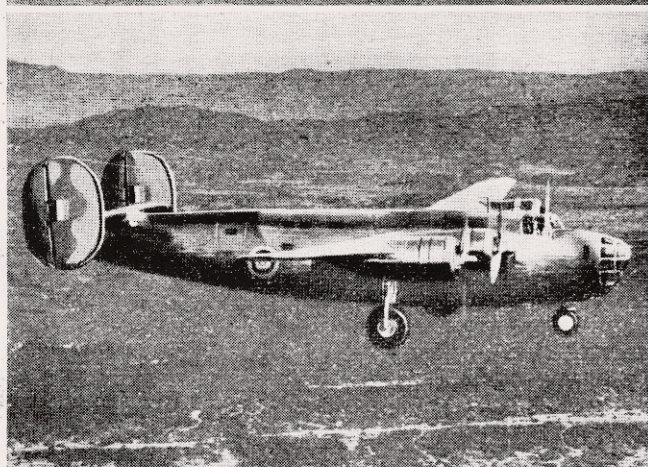
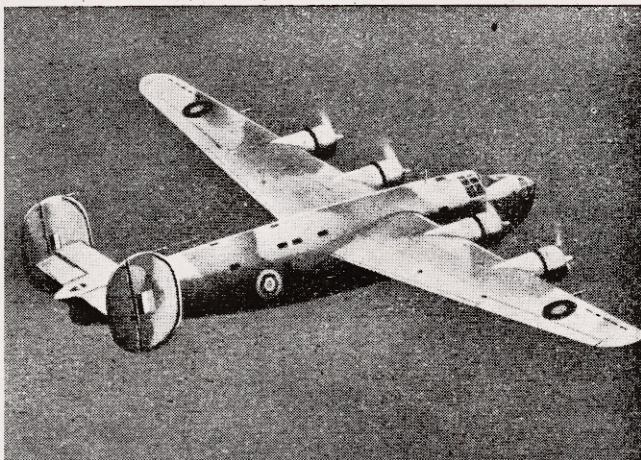
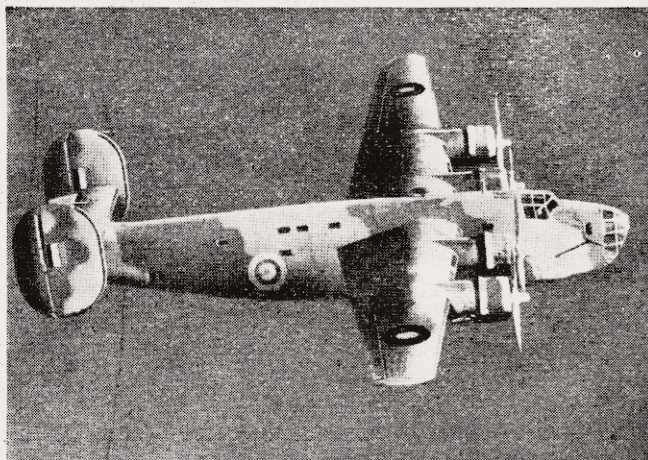
**WEIGHTS.**—Empty, 15,591 lb.; loaded, 24,000 lb.

**PERFORMANCE.**—Top speed, 215 m.p.h. at 7,700 ft.; range, 1,565 miles at 191 m.p.h. at 10,200 ft.; initial climb, 1,065 ft. per min.; service ceiling, 21,400 ft.

**POINTS OF RECOGNITION.**—Tapered low wings with swept-back leading edge and straight trailing edge. Pointed tips and marked dihedral. Deep cylindrical fuselage. Radial motors set into wings at ends of centre section. Single fin and rudder. The DC-3 can be distinguished by its large tail unit with the fin extending along fuselage for about one-third of its length. Tailplane has swept-back leading edge.







**THE "LIBERATOR"**—The Consolidated Model 32 four-motor bomber, designated the B-24 by the U.S. Army and the "Liberator" by the R.A.F. Four 1,200 h.p. Pratt and Whitney Twin Wasp motors give it a top speed of about 330 m.p.h. The first of 120 on order should reach this country shortly.

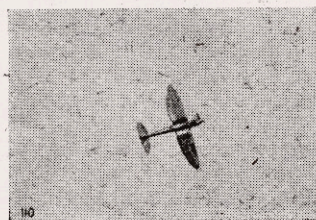
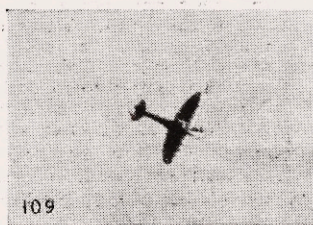
**A SUPERMARINE SPITFIRE MK. I** single-seat fighter (1,030 h.p. Rolls-Royce Merlin II motor) and a Heinkel He 118 two-seat dive bomber (660 h.p. B.M.W. VI motor) were the recognition tests last week.

Both machines have elliptical wings of somewhat similar form, both swept forward so that the leading edges are more nearly straight.

The wing of the He 118 has the characteristic Heinkel "bite" out of the wing roots at the trailing edge, so formed to reduce wing-fuselage "interference."

The Spitfire can be identified in the view shown by its wing form, by the prominent off-set radiator under the star-

## AIRCRAFT RECOGNITION



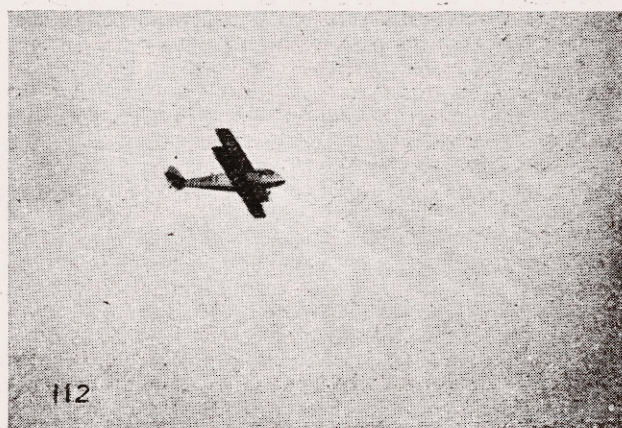
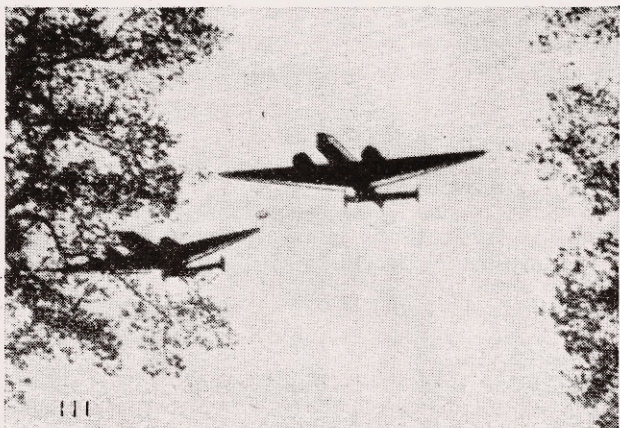
**LAST WEEK'S PROBLEMS.**—Left, a Spitfire; right, an He 118.

board wing and by the characteristic tailplane. The position of the eight guns in the wings can be made out by blast stains underneath.

The distinctive features of the He 118, apart from the wing form, are that the wing-roots slope down from the fuselage (so that the He 118 is a low mid-wing monoplane) and that the tailplane is

of higher aspect ratio than that of the Spitfire. The radiator is close behind the spinner under the nose and well in front of the wing.

The Heinkel He 118 was used by the Luftwaffe in the Polish campaign, but little has been heard of it recently.



**FOR IDENTIFICATION II.**—Two more photographs to give practice in the distant recognition of friendly and enemy aeroplanes. What they are and notes on their characteristics will be published, with two more photographs, next week.



# THE HEARKERS' CLUB

## HEARKERS' CLUB No. 1 (GUILDFORD)

Hon. Sec.: R. O. Dowdeswell, Rodboro Buildings, Bridge Street, Guildford.

The Annual General Meeting will be held at the Guildford Technical College, Stoke Park, on Saturday, Jan. 25, at 2.30 p.m., to elect the officers for the ensuing year, full details of which have been sent to all members of the Committee. This meeting will be followed by the usual monthly meeting, which will commence at 3 p.m. The speaker will be Peter Masfield, after which the usual IIIrd class examinations will be held.

## HEARKERS' CLUB No. 8 (ANGUS)

Hon. Sec.: D. A. Gardner, "Tantallon," 81, Keptie Road, Arbroath.

Our first meeting on Dec. 15 saw the club well launched with an encouraging attendance of 34 members from five different posts.

Mr. N. J. H. Goodchild, O.G.O., was elected President.

Lieut. Peters, R.N., gave an illustrated talk on "Clouds" and explained how far recognition of the different types of cloud could be used to estimate the height of aircraft observed from the ground.

Mr. Murray, G3, and Mr. McNiven, H.O., CI, each demonstrated a "home-made" instrument for estimating height. All three speakers were thanked for providing such useful and interesting information.



VICKERS-ARMSTRONGS WELLINGTONS.

## Syllabus of Aeroplanes for Harkers' Club Third Grade Certificate Examination

THE FOLLOWING 55 aeroplanes 37 British and 18 German) are among the most common at present in general service and among the most likely to be seen over the British Isles or round our coasts. They form a basis for initial study, and selections may be made from them according to the types most commonly seen in different parts of the country.

Thirty-one silhouettes of side and underneath plan views selected from these 55 aeroplanes are used for the Third Grade Examination of the Harkers' Club. The list constitutes an excellent foundation for study for all those concerned with aircraft recognition.

### British Aeroplanes

AIRSPED OXFORD two-motor trainer.  
ARMSTRONG WHITWORTH WHITLEY IV bomber.  
AVRO ANSON reconnaissance monoplane and trainer.  
BLACKBURN SKUA fleet fighter-dive bomber.  
BLACKBURN Roc two-seat fleet fighter.  
BRISTOL BEAUFORT general purpose torpedo-bomber.  
BRISTOL BLENHEIM I fighter-bomber.  
BRISTOL BLENHEIM IVF fighter-bomber.  
BRISTOL BOMBAY bomber-transport.  
BOULTON PAUL DEFIANT two-seat fighter.  
CONSOLIDATED MODEL 28 (PBY-5) flying-boat.  
DE HAVILLAND FLAMINGO or HERTFORDSHIRE (D.H.95) transport.  
DE HAVILLAND TIGER Moth (D.H. 82A) trainer.  
FAIRY ALBACORE T.S.R. biplane.  
FAIRY BATTLE bomber.  
FAIRY BATTLE advanced trainer.  
FAIRY FULMAR two-seat fleet fighter.  
FAIRY SEAFOX light reconnaissance seaplane.  
FAIRY SWORDFISH T.S.R. biplane.  
GLOSTER GLADIATOR fighter.  
HAWKER AUDAX trainer.  
HAWKER HURRICANE Mk. I fighter.  
HANDLEY PAGE HAMPDEN bomber.  
HANDLEY PAGE HEREFORD bomber.  
LOCKHEED HUDSON reconnaissance bomber.  
MILES MAGISTER trainer.  
MILES MASTER advanced trainer.  
NORTH AMERICAN HARVARD I advanced trainer.  
SARO LERWICK flying-boat.  
SARO LONDON Mk. II flying-boat.  
SHORT SINGAPORE III flying-boat.  
SHORT SUNDERLAND flying-boat.  
SUPERMARINE SPITFIRE Mk. I fighter.  
SUPERMARINE STRANRAER flying-boat.  
SUPERMARINE WALRUS II fleet spotter amphibian.  
VICKERS-ARMSTRONGS WELLINGTON Mk. Ia bomber.  
WESTLAND LYSANDER Army Co-operation monoplane.

### German Aeroplanes

DORNIER Do 17 bomber.  
DORNIER Do 18K flying-boat.  
DORNIER Do 24 flying-boat.  
DORNIER Do 215 bomber.  
FOCKE-WULF Fw 200K Condor bomber-transport.  
HEINKEL He 111K Mk. IIA bomber.  
HEINKEL He 111K Mk. VA bomber.  
HEINKEL He 113 fighter.  
HEINKEL He 115 float seaplane.  
HENSEL Hs 126 Army Co-operation monoplane.  
JUNKERS Ju 52/3m transport.  
JUNKERS Ju 86K bomber.  
JUNKERS Ju 87B dive bomber.  
JUNKERS Ju 88-A1 dive bomber.  
JUNKERS Ju 90 transport.  
MESSERSCHMITT Me 109 fighter.  
MESSERSCHMITT Me 110 two-motor fighter.  
MESSERSCHMITT JAGUAR bomber.

## FORTHCOMING EVENTS

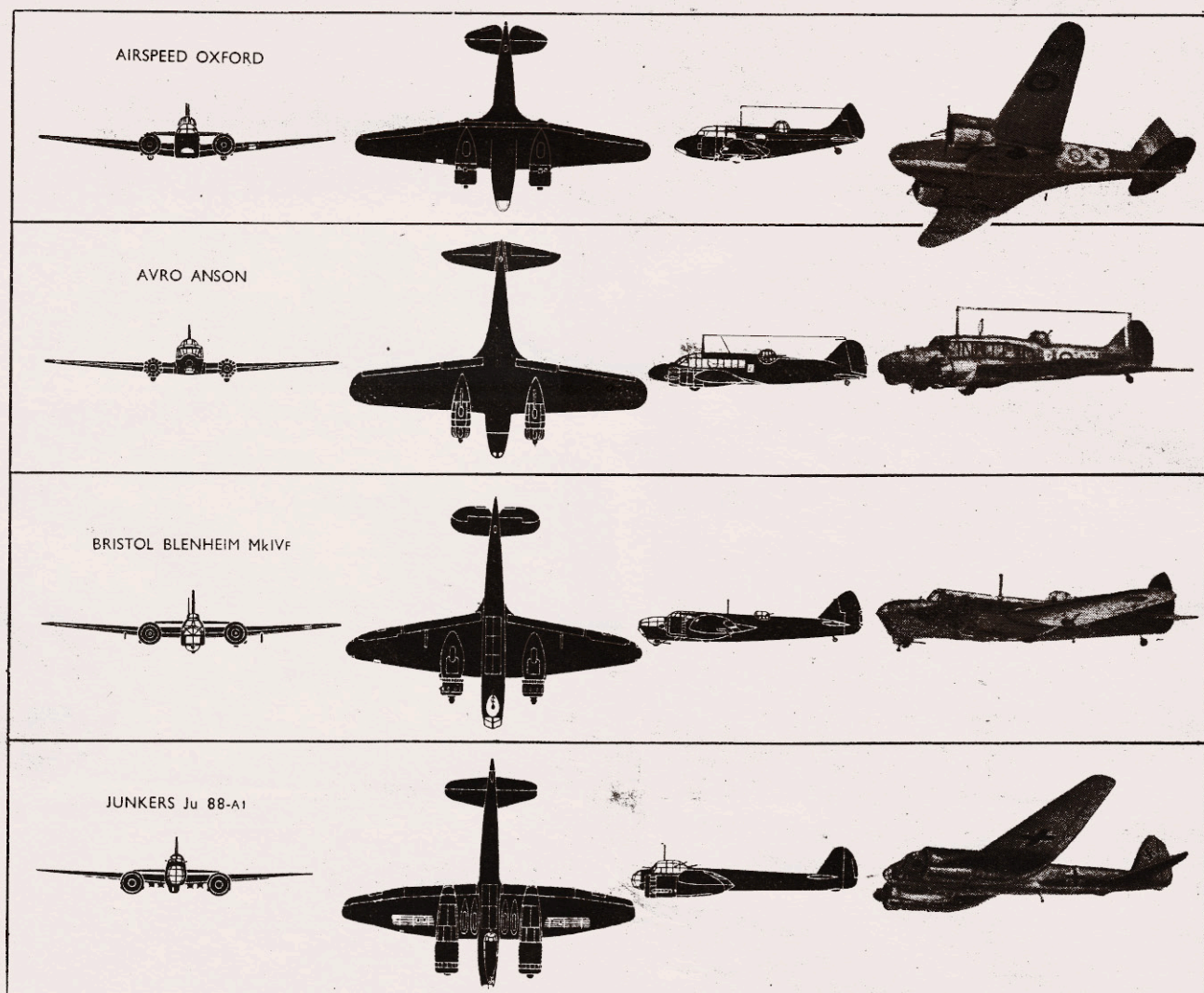
Jan. 12.—Shirley.—Harkers' Club No. 2.—Talk by Mr. J. H. Stevens, Jun., on "The Aeroplane as a Family." Mr. R. A. Saville-Sneath will talk on "Cloud Forms in Relation to Height" at the Shirley Poppy Hotel.—10.00 hrs.  
Jan. 12.—Watford.—Harkers' Club No. 3 (Hendon).—Talk by Mr. Leonard Taylor on "Aeroplane Record-Breakers" and by Mr. J. G. M. Miller on "New Types of Aeroplanes in the

R.A.F." At Watford Public Library.—10.30 hrs.  
Jan. 12.—Arbroath.—Harkers' Club No. 8 (Angus).—Visit to "An Aerodrome." Meet at main entrance 14.45 to 15.00 hrs.  
Jan. 19.—Evesham.—Harkers' Club No. 5.—Meeting at the Co-operative Hall, Evesham.—10.30 hrs.  
Jan. 25.—Guildford.—Harkers' Club No. 1.—Annual General Meeting at Guildford Technical College, Stoke Park.—14.30 hrs.



## AIRCRAFT COMPARISON—II.

## SOME TWO-MOTOR MONOPLANES.



Drawings copyright "The Aeroplane."

*SUBJECTS OF CONFUSION—Drawings and photographs which bring out the main points of difference between four of the more common two motor monoplanes with single fins and rudders.*

## THE SPOTTER'S GLOSSARY OF AERONAUTICAL TERMS.

**AERODROME.**—A prepared area of land or water, including all buildings and fixtures, intended to be used for the operation of aircraft.

**AERODYNAMICS.**—The science of the laws relating to forces acting on bodies moving in air.

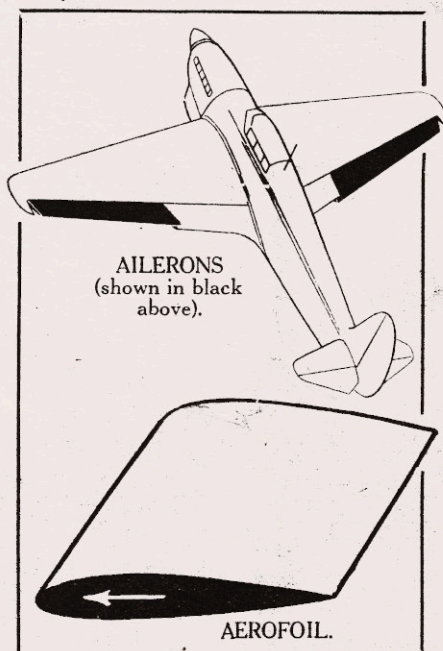
**AERODYNE.**—A generic term for heavier than air aircraft which derive their lift when flying chiefly from aerodynamic forces—aeroplanes, gyroplanes, helicopters, ornithopters, kites or gliders.

**AERO-ENGINE.**—The power-plant for an aerodyne or aerostat. See **AERO-MOTOR**.

**AEROFOIL.**—A surface designed to produce an aerodynamic force at approximately right-angles to its direction of motion. Usually a wing, tailplane or fin.

**AERO-MOTOR.**—The power-plant for an aerodyne or aerostat used preferably to **AERO-ENGINE** because it is more generally understood internationally.

**AERONAUTICS.**—The study of all branches and activities of flying. Also the title of a British monthly aeronautical journal.



**AEROPLANE.**—A mechanically driven heavier than air flying machine which has fixed wings. An aerodyne with fixed wings. The term includes landplanes, seaplanes and amphibians. The word should be used in preference to the generic term "aircraft" when an aeroplane is specifically meant. Also the name of the weekly British aeronautical journal.

The abbreviation "'plane," commonly used is not correct and should be avoided. "Plane" properly means a wing.

**AEROSTAT.**—A generic term for aircraft which derive their lift chiefly from buoyancy in the air: lighter than air craft, balloons, or airships.

**AILERON.**—Movable aerofoil fitted near the wing tip of an aeroplane and designed to make possible a rolling movement about the longitudinal axis. Ailerons are invariably connected differentially to the control column so that when one is raised to depress a wing the other is lowered to raise its wing.

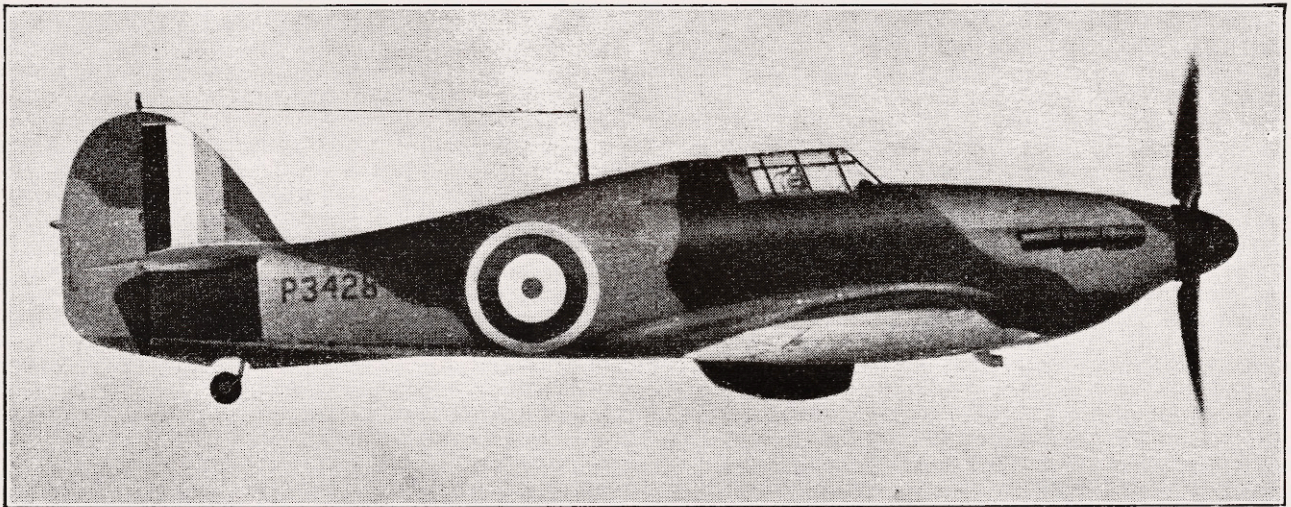
**AIRFRAME.**—The structure of an aeroplane without the motor(s).

(To be continued)

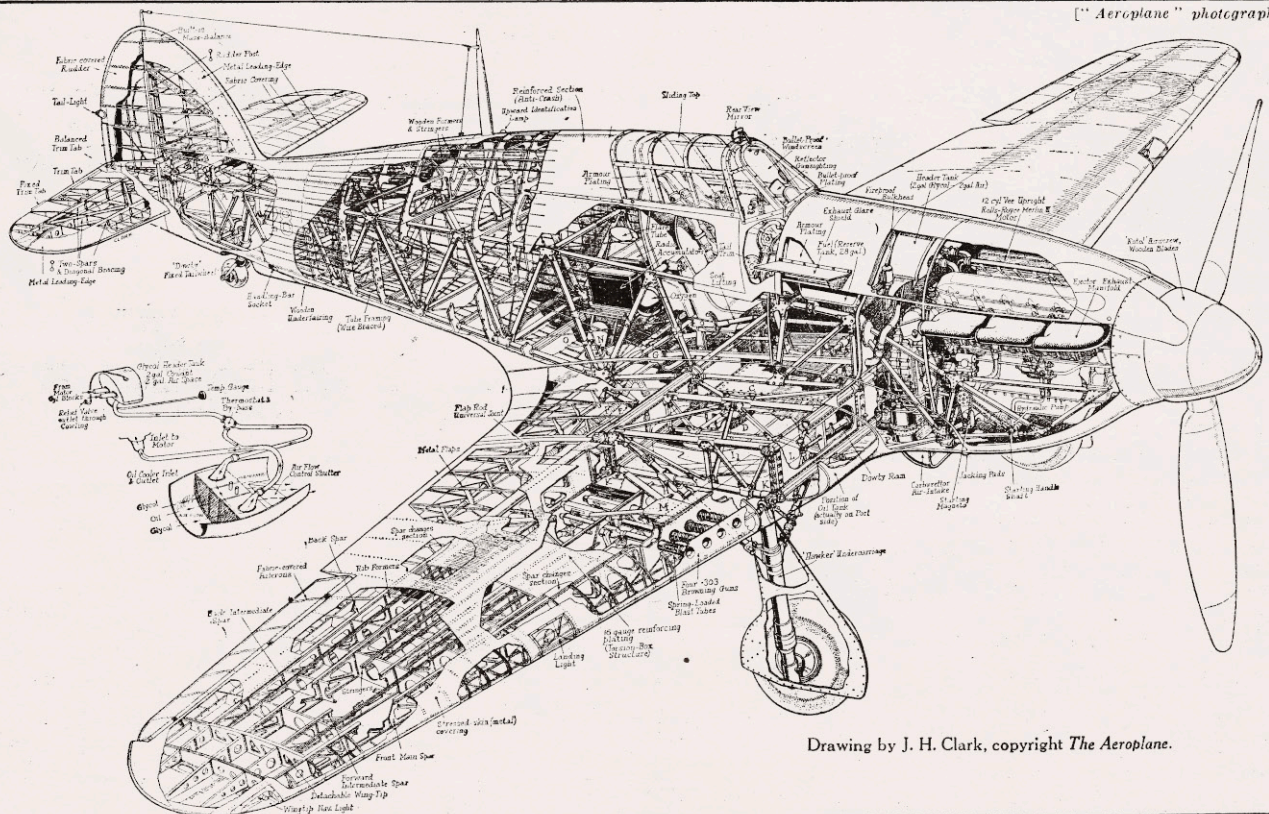


AEROPLANES IN DETAIL—II

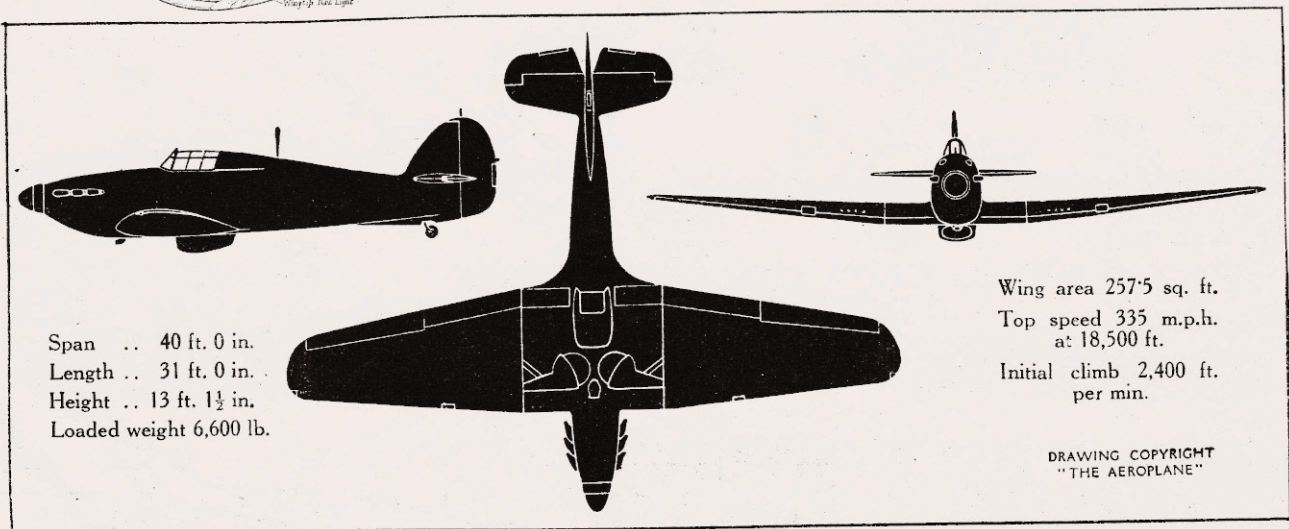
THE HAWKER HURRICANE MK I SINGLE-SEAT FIGHTER  
(One 1,030 h.p. Rolls-Royce Merlin II Motor)



["Aeroplane" photograph]

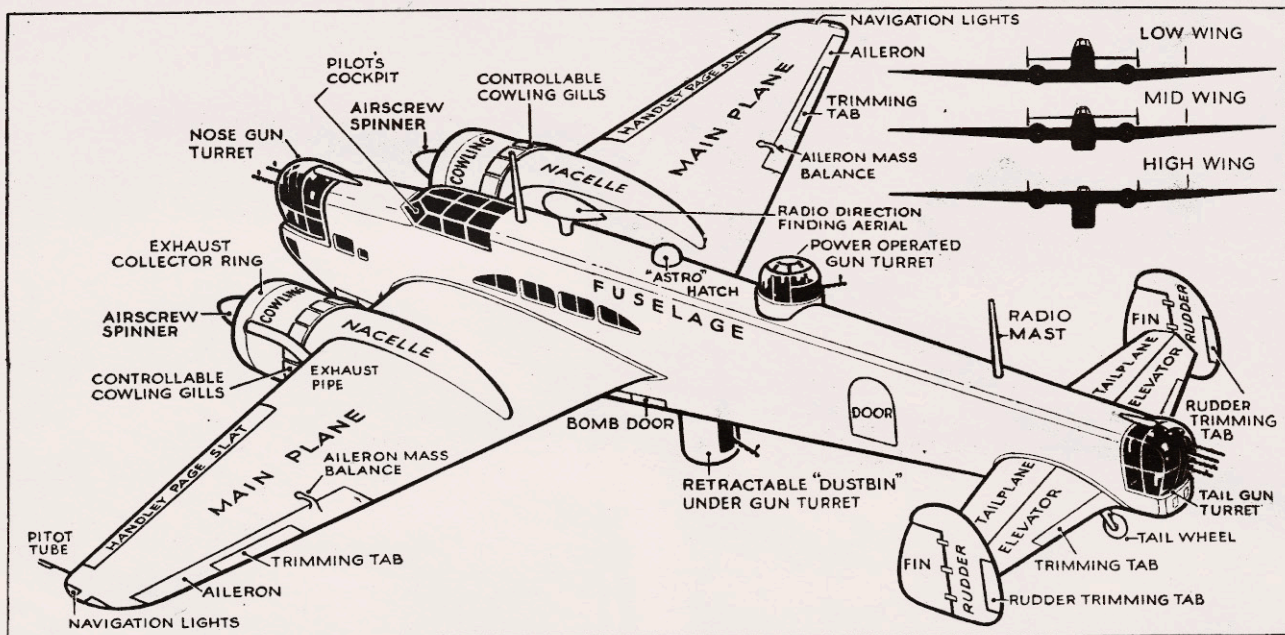


Drawing by J. H. Clark, copyright *The Aeroplane*.





## BY THESE NAMES SHALL YE KNOW THEM



AERONAUTICAL TERMS—I—The parts of a typical two-motor bomber with twin fins and rudders.

"Aeroplane Spotter" drawing.

## IDENTITY PROBLEMS

## Mental Aerobatics.—II

A FAST high-flying aeroplane passed over six different spotters. Because of intermittent cloud each observer was able to distinguish only one point. They sent the following reports to the Centre:—

1. Two motors.
2. Twin fins and rudders.

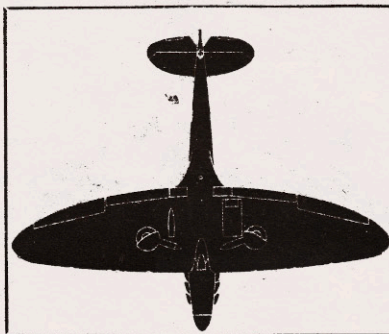
3. Rather pointed nose; no nose turret.
4. Liquid cooling.
5. Fixed tail-wheel.
6. Low-wing square tips.

Centre was able to identify the machine without hesitation. What was it?

## A MATTER OF MOMENT

"PRAISE is welcome, but only criticism leads to progress" is an old adage with which we commend this and forthcoming issues of THE AEROPLANE SPOTTER to our readers. We shall endeavour to supply the most needed news and to maintain a high standard of accuracy.

With these resolutions before us our chagrin was profound to find that in the first issue last week the plan silhouette of the Spitfire had been reversed during its preparation, so that in two underneath views the radiator appeared under the port instead of the starboard wing. The correct silhouette is printed in the next column.



## LAST WEEK'S PROBLEMS

## Solution to Mental Aerobatics—I

From 1. Lowings flew Gladiator or Hampden.

From 2. Linton flew Fulmar or Defiant.

From 3. Stroud flew Fulmar or Gladiator.

From 4 and 1. Lowings flew Gladiator.

Therefore from 3. Stroud must fly Fulmar.

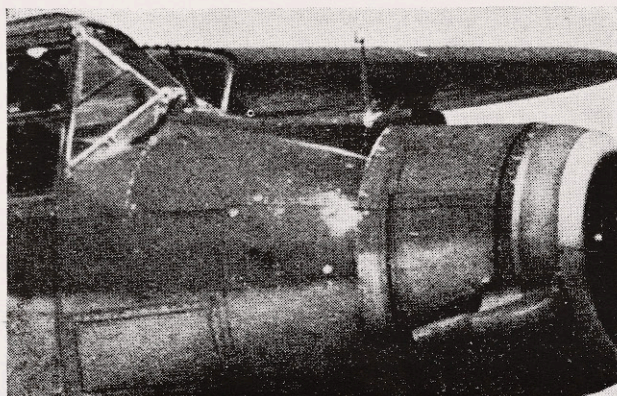
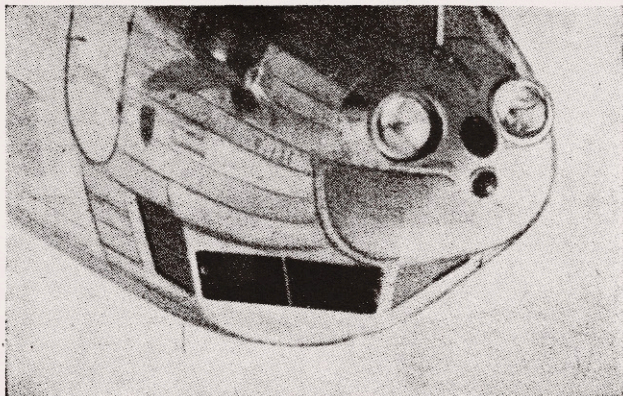
Therefore from 2. Linton must fly Defiant.

Therefore Brock flies Hampden.

## SOLUTION TO LAST WEEK'S CROSSWORD

ACROSS:—1, Mew. 5, Wellesley. 10, A.W. 11, Allison. 13, S.E. 14, Sleet. 15, P.S. 16, Tie. 17, Link. 18, A.U.T. 19, e.g. 21, C.G. 22, Car. 24, Trader. 28, Lagoon. 30, V.O. 31, Bacon. 32, Deep.

DOWN:—2, Elastic. 3, Wellington. 4, Westland. 5, Wasp. 6, Ewes. 8, Sleet. 9, Yo. 12, Northrop. 19, E.C. 20, Gala. 23, R.A.C. 25, Ro. 26, And. 27, Eve. 29, Go.



WHERE AND WHAT?—Two more posers to test detailed knowledge. The problems last week were (left) the nose of an Armstrong Whitworth Whitley IV and (right) the tail of a Junkers Ju 52.

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